

The Department of Biology Program Planning Packet, Fall 2018



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REQUIREMENTS FOR BIOLOGY MAJORS

There are four ways to complete a major in Biology. A student can obtain a general Biology Major or may complete one of the three majors that concentrate on a specific level of Biological organization: Cell and Molecular Biology, Physiology and Organismal Biology, or Ecology and Evolutionary Biology.

Introductory Biology and Genetics

All Biology majors must complete the 1500-level introductory sequence followed by a course in Genetics:

- BIOL BC1500x Introduction to Organismal and Evolutionary Biology
- BIOL BC1501x Introductory Lab in Organismal and Evolutionary Biology
- BIOL BC1502y Introduction to Cell and Molecular Biology
- BIOL BC1503y Introductory Lab in Cell and Molecular Biology
- BIOL BC 2100 Molecular and Mendelian Genetics

It is recommended, but not required, that Genetics be taken immediately after completing the 1500-level introductory sequence.

Five upper-level courses

All Biology majors must complete five upper-level courses, with category distribution requirements listed in the table below. Courses that fulfill each category are listed on the next page. To complete the Biology Major without a concentration, the five courses must include at least one course from each of the three categories. To complete one of the three concentrations, at least 4 courses must be from the appropriate category and at least 1 from another category. Although some courses are listed in multiple categories, a student can only use a course towards one of the categories. Additional Columbia courses that can be used to fulfill the major requirements are provided on the Biology website. If a student completes courses that make her eligible for more than one of the four majors, then she may select which one is reflected on her transcript.

Upper level course requirements for the four Biology majors:

<u>Major</u>	<u>Course Selection</u>
Biology	Five courses with at least one course from each of the three categories.
Cell & Molecular Biology	Four courses from the Cell & Molecular Biology category, one from another category.
Physiology & Organismal Biology	Four courses from the Physiology & Organismal Biology category, one from another category.
Ecology & Evolutionary Biology	Four courses from the Ecology & Evolutionary Biology category, one from another category.

**Categories of upper-level courses in the Biology Major
(see the last page of this packet for courses offered in Fall 2018)**

Cell & Molecular Biology:

BIOL BC2278	Evolution
BIOL BC3308	Genomics and Bioinformatics
BIOL BC3310	Cell Biology
BIOL BC3320	Microbiology
BIOL BC3352	Development
BIOL BC3362	Molecular and Cellular Neuroscience
CHEM BC3282	Biochemistry I
BIOL W3034	Biotechnology
BIOL W3073	Cellular and Molecular Immunology
BIOL W3310	Virology

Physiology & Organismal Biology

BIOL BC2262	Vertebrate Biology
BIOL BC2280	Animal Behavior
BIOL BC2286	Statistics and Research Design
BIOL BC3320	Microbiology
BIOL BC3360	Physiology
BIOL BC3367	Ecophysiology
EEEE W3011	Behavioral Biology of Living Primates
EEEE W3208	Explorations in Primate Anatomy
EEEE W4112	Ichthyology
BIOL W3005	Neurobiology: Development & Systems

Ecology & Evolutionary Biology

BIOL BC2240	Plant Evolution and Diversity
BIOL BC2262	Vertebrate Biology
BIOL BC2272	Ecology
BIOL BC2278	Evolution
BIOL BC2280	Animal Behavior
BIOL BC2286	Statistics and Research Design
BIOL BC2851	Plants & Profits: The Global Power of Botany
BIOL BC3280	Applied Ecology and Evolution
BIOL BC3367	Ecophysiology
BIOL BC3388	Tropical Ecology
EEEE W3087	Conservation Biology
EEEE W4110	Coastal Estuarine Ecology

Three upper-level laboratory courses

Students may take any upper-level Biology lab courses for which they have the pre- or co-requisite. A year-long research-seminar course may substitute for lab courses, as described below. Students may also take laboratory courses at Columbia (or other institutions) to satisfy the lab requirement, with permission from the Associate Chair.

Guided Research and Seminar

Enrollment in the year-long sequence of Guided Research and Seminar (BIOL BC3591x, 3592y) can be used to fulfill two upper-level labs. This course is only available as a Fall-Spring sequence.

Senior Capstone Experience

All Biology majors must complete the Senior Capstone Experience with either of the following two options:

1. One semester of Senior Seminar BIOL BC3590
In Senior Seminar, enrolled students participate in a seminar focusing on primary literature and compose, and give a presentation on, a senior thesis in the format of a literature review.
2. The year-long Senior Thesis Research and Seminar (BIOL BC3591x, 3592y)
In Senior Thesis Research and Seminar, students complete an original research project in a lab and compose, and give a presentation on, a senior thesis in the format of a primary research paper.

Chemistry Requirement

All majors, regardless of their track, must complete at least one semester of General Chemistry (with laboratory) and at least one semester of Organic Chemistry (with laboratory).

REQUIREMENTS FOR THE BIOLOGY MINOR

A minor in biology includes:

1. One year of introductory biology (BIOL BC1500, BC1501, BC1502, BC1503).
2. Three biology lecture courses at the 2100 level or higher.
3. Two biology laboratory courses. One of the lab courses may be replaced by two semesters of Guided Research and Seminar (BIOL BC3591x followed by BIOL BC3592y).

Please note: Chemistry, environmental science, physics, and psychology majors need to take only one advanced laboratory instead of two, but the lab may NOT be a guided research course.

ADVISING POLICY

In the biology department, students select their advisors rather than having them assigned. The student's choice must be approved and her major declaration form signed by the Associate Chair. Any biology faculty member can serve as an advisor. There are also two interdepartmental majors (below).

RELATED DEPARTMENTS AND MAJORS

Environmental Biology

(Potential advisors in the Biology Department are Profs. Callahan and Hertz)

This major is run jointly by faculty in the Departments of Biology and Environmental Science. It examines the interactions between living and non-living components of the environment, and how human activities alter these interactions. <http://envsci.barnard.edu/majors/environmental-biology>

Neuroscience and Behavior

(Potential advisors in the Biology Department are Profs. Bauer, Glendinning and Hertz)

This major is run jointly by faculty in the Departments of Biology and Psychology. It provides a strong background in the biological underpinnings of behavior and cognition. <http://neuroscience.barnard.edu/>

RESEARCH OPPORTUNITIES

We strongly encourage students to get involved in research during the summer, academic year, or both. For many students, research is one of the most intellectually rewarding experiences at Barnard. When research is conducted during the academic year, students can receive credit for working in a laboratory at Barnard or anywhere else in New York City. Research can be conducted during any (or all) semesters of the major.

Three courses provide credit for research during the academic year. Before signing up for any of these courses, you should examine the associated [Checklists for Enrollment](#) located on the Biology website:

1. **Guided Research (BIOL BC3597):** This is a variable-credit one-semester course, which can be taken during any Fall or Spring semester.
2. **Guided Research & Seminar (BIOL BC3591-2):** This is a year-long course that begins in the fall. It can serve in lieu of 2 laboratory requirements for the Biology major.
3. **Senior Thesis Research (BIOL BC3593-4):** This is a year-long course, beginning in the fall the senior year. It can serve of the Senior requirement or in lieu of 2 laboratory requirements for the Biology major (but not both).

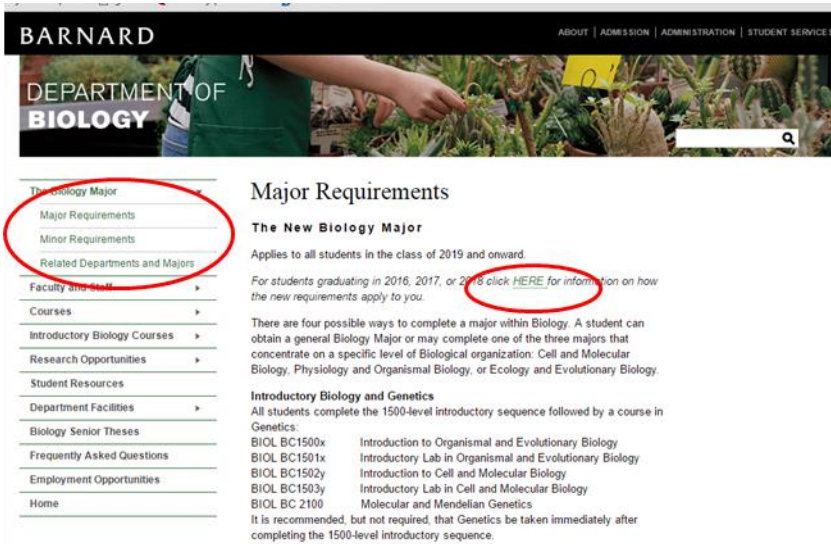
Please Note: You cannot get credit for doing research during the summer

BIOLOGY MAJORS-LEVEL COURSES OFFERED FALL 2018

BIOL BC1500	Introduction to Organismal & Evol Biology	Paul Hertz	MWF 9:00am-9:50am
BIOL BC1501	Introductory Lab in Organismal & Evol Biology	Jessica Goldstein	Various
BIOL BC1511	Recitation for Introductory Lab	Jessica Goldstein	M 10:00am-10:50am or F 1:00pm-1:50pm
BIOL BC2100	Molecular and Mendelian Genetics	Brian Morton	T TH 10:10am-11:25am
BIOL BC3310	Cell Biology	Jonathan Snow	T TH 8:40am-9:55am
BIOL BC3320	Microbiology	TBA	T TH 11:40am-12:55pm
BIOL BC3362	Molecular and Cellular Neuroscience	Elizabeth Bauer	M W 11:40am-12:55pm
BIOL BC2281	Laboratory in Animal Behavior	Alison Pischedda	W 1:10pm-6:00pm
BIOL BC2801	Laboratory in Genetics	TBA	TH 1:10pm – 6:00pm
BIOL BC3311	Laboratory in Cell Biology	Jonathan Snow	TH 1:10pm-6:00pm
BIOL BC3321	Laboratory in Microbiology	TBA	T 1:10pm-6:00pm
BIOL BC3305*	Project Laboratory in Molecular Genetics	Jennifer Mansfield /Brian Morton	W 1:10pm-6:00pm
BIOL BC3590	Senior Seminar	Hilary Callahan	M 6:10pm-8:00pm
BIOL BC3591*	Guided Research and Seminar	Jessica Goldstein/ Alison Pischedda	M 1:10pm-3:00pm
BIOL BC3593*	Senior Thesis Seminar	Jessica Goldstein/ Alison Pischedda	M 1:10pm-3:00pm

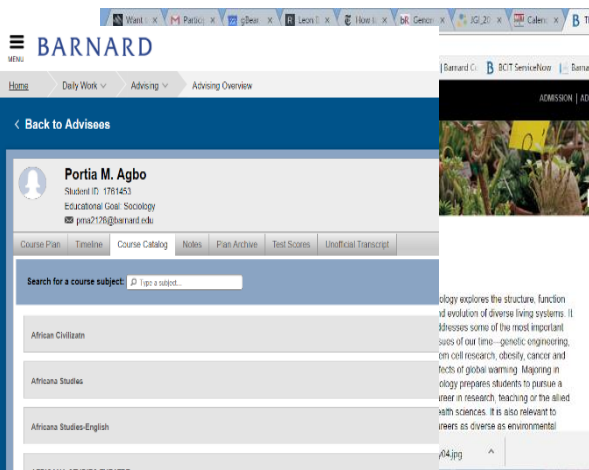
*Full Year Course

Tips for Navigating the Biology Website



1. Information on the Biology Majors and minor can be found in the Biology Majors pages, and is also included in this packet.

Check the BC or CU course catalog for courses offered in a current semester (also included on p.5 of this packet)



2. Every student should meet with her advisor to discuss two topics:

- Program through graduation
- Fall 2018 program

Courses offered Fall 2018 are in this packet and at the BC and CU course catalogs. The Biology webpage also lists Columbia courses that count toward Biology majors.

3. Information on Research for Credit can be found in the Research Opportunities pages.

- Research plans should be discussed with academic advisor

- Research for credit can be done in any year.

- Research can be used toward upper level lab or senior thesis credit (thesis)

- can be done in a Barnard or Columbia lab, or at another nearby institution.

